TWO NEW SPECIES OF *COPIDOGNATHUS* (HALACARIDAE : ACARI) FROM KERALA[1]

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(*With seventeen text-figures*)

Key words: Halacaridae, Acari, *Copidognathus*, new species, Kerala

Two new species of Halacaridae (Acari), *Copidognathus keralensis* and *C. balakrishnani* are reported here from Kovalam coast and Cochin backwaters respectively. Both species were collected among phytal samples.

INTRODUCTION

Four species of Halacaridae, namely *Copidognathus sideus* Bartsch, *Arhodeoporus bonairensis* Viets; *Rhombognathus papuensis* Bartsch, and *R. scutulatus* Bartsch, have been reported by me from Kerala (Chatterjee and Sarma 1993, Sarma and Chatterjee 1993, Chatterjee 1995)

In the present communication, two new species of the genus *Copidognathus* are reported here from Kerala.

Abbreviations used in the text: AD- anterodorsal plate, AE- anterior epimeral plate, OC- Ocular plate, PD- Posterodorsal plate, PE- Posterior epimeral plate, GA- Genitoanal plate, GO- Genital opening, PGS- Perigenital seta, SGS- Subgenital seta, PAS- Parambulacral seta, EP I- Epimeral process I.

Copidognathus keralensis sp. nov.
(Figs. 1-9)

Locality: Males and females are encountered among different algae from Kovalam beach, Kerala.

Type: Holotype (♂), allotype (♀) will be deposited in the National Pusa Collection, Entomology Division, IARI, New Delhi.

Etymology: Named after the type locality Kerala.

Description: MALE: The idiosomal length of males ranged between 200 and 240 µm.

All dorsal plates are separate (Fig. 1). AD bears an inverted funnel-shaped areola (Fig. 3). The ds_1 is located at the base of the stem of inverted funnel and ds_2 on anteromedian margin of OC. Two distinct corneae are present on OC anteriorly. A few rosette pores present between the two corneae. OC is caudiform posteriorly and extends halfway between the insertion of legs III and IV. PD bears two costae which are two pores wide. The ds_3, ds_4 and ds_5 are located on the anterior, middle and posterior areas of PD respectively.

All ventral plates are separate (Fig. 2). AE does not bear any areolae. AE with 3 setae. EP I moderately developed and blunt anteriorly. EP I coxal in origin. PE bears 3 ventral and 1 dorsal seta besides 2 ventral areolae, made up of rosette pores located in the anterior and posterior regions. GA with paragenital areolae made up of rosette pores. GO is guarded by a pair of sclerites. Three pairs of SGS are present in GO (one anteriorly and two posteriorly). 8-10 pairs of PGS are present.

Rostrum extends more than 2/3 of the length of palpal femur. Gnathosoma bears areolae made up of rosette pores ventrolaterally. Dorsal portion of gnathosoma is panelled. A pair of proto-, deuto, trito- and basirostral setae are present on gnathosoma. Palp 4-segmented (Fig. 4). Palpal

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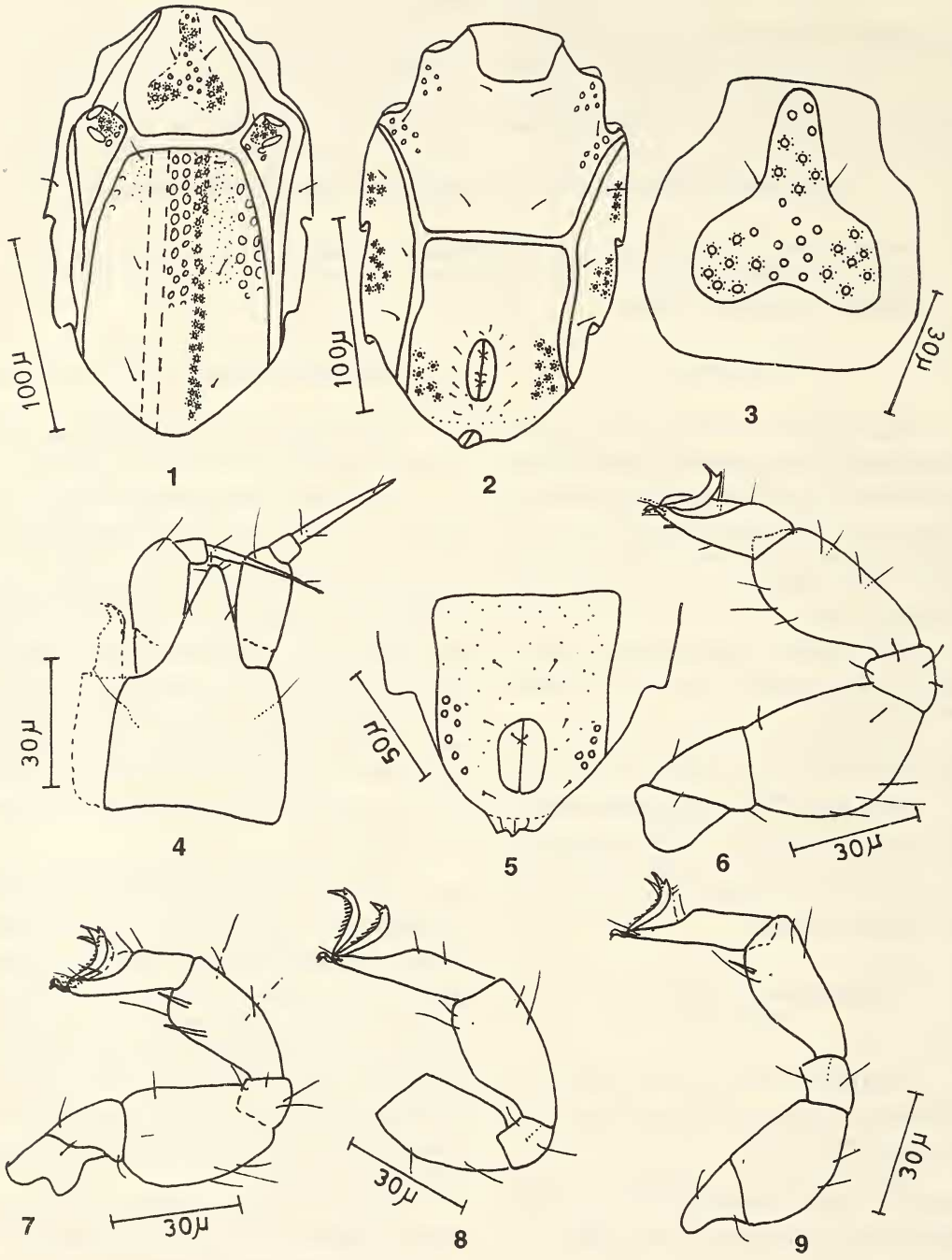


Figs.1-9: *Copidognathus keralensis* sp. nov.
1. idiosoma dorsal (♂); 2. idiosoma ventral (♂); 3. magnified view of AD; 4. gnathosoma; 5. GA of ♀; 6. leg I; 7. leg II; 8. leg III (Basifemur-tarsus); 9. leg IV (Telofemur-tarsus).

trochanter and patella without setae, palpal femur with one dorsal seta. Palpal tibiotarsus bears 3 setae basally and a singlet eupathidia distally.

Chaetotaxy of legs I-IV is as follows:

Trochanter	1-1-1-0,
Basifemur	2-2-2-2,
Telofemur	5-5-2-2,
Patella	4-4-3-3,
Tibia	7-7-5-5.

Chaetotaxy of tarsus is discussed in the text.

Telofemora III and IV devoid of any ventral setae (Figs. 8, 9), Tibiae I and II with three ventral and four dorsal setae. Tarsus I with 3 dorsal long setae, 1 solenidion, 1 profamulus, 3 ventral setae (one filiform basally and two singlet eupathidia distally) and 4 PAS (two eupathidia doublets) (Fig. 6). Tarsus II bears 3 dorsal long setae, 1 solenidion and 2 PAS (two singlet eupathidia) and no ventral setae (Fig. 7).

FEMALE: The idiosomal length of females ranged between 220 µm and 240 µm. Female resembles the male except for genitoanal region. Three pairs of PGS and a pair of SGS are present (Fig. 5). Ovipositor is small.

Discussion: The present species shares many characters of *Copidognathus oculatus* group of Bartsch (1977).

"A median quadrangular area on the AD, long OC, 2 costae with rosette pores, well developed epimeral process, in females ovipositor surpassing the foramen of the GO. In males, PGS arranged in a corona close to the genital foramen, with a small knob posterior to GO and only three pairs of SGS present, pectinate setae present on all tibiae" (Bartsch 1984) distinguishes the *oculatus* group.

C. keralensis also appears to be akin to the key group 5200 of Newell (1984) due to presence of a well developed EP I, coxal in origin; ds_2 on the anterior margin of OC (in both sexes), a pair of basirostral setae, telofemorae III and IV devoid of ventral setae, and parallel striae present in the membranous area between AD and PD. Considering these attributes, it is possible to assign all the species of *oculatus* group to the key group 5200 but only a few species of the key group 5200 can be assigned to the *oculatus* group, since the key group is an artificial cluster of several unrelated heterogenous species whose characters do not match exactly with the homogenous and natural cluster '*oculatus* group'.

C. keralensis sp. nov. differs from all the species of *oculatus* group and those of key group 5200 in the presence of an inverted funnel-shaped areola of AD. *C. oculatus*, *C. ypsilophorus* and *C. modestus* have more similarities with *C. keralensis* but differ in the shape of posterior areolae of AD. In *C. ypsilophorus*, the inverted Y-shaped areola of AD is deeply concave at its posterior margin and further from posterior margin of AD. In *C. keralensis*, the posterior margin of the inverted funnel-shaped areola is relatively shallower and nearer the posterior margin of AD. The costae of PD are two rosette pores wide in *C. keralensis*, one rosette pore wide in *C. modestus* and 5-7 pores wide in *C. ypsilophorus*. Further, paracostae are absent in *C. keralensis,* but present in *C. ypsilophorus*.

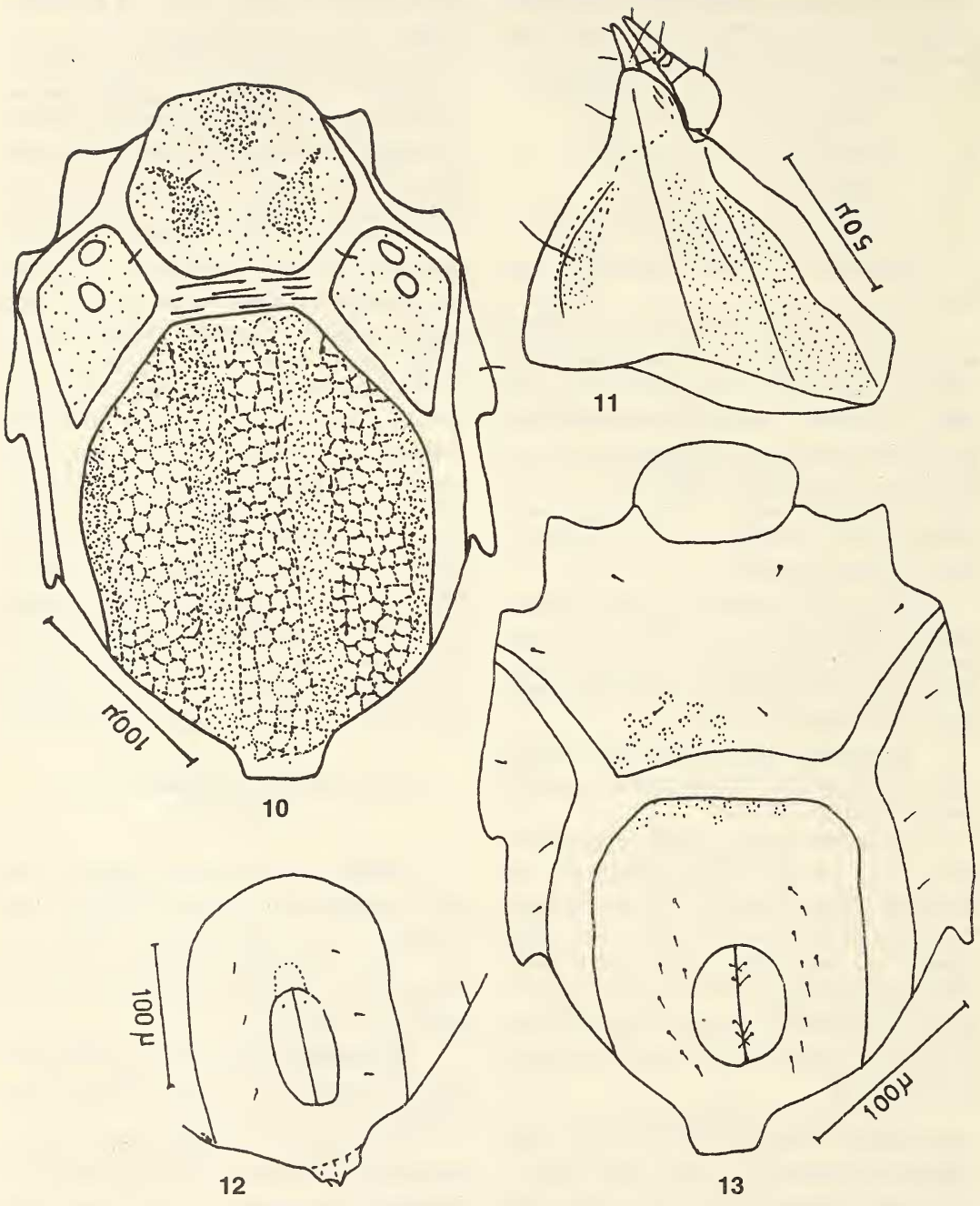
Copidognathus balakrishnani sp. nov.
(Figs. 10-17)

Locality: Male and female specimens were encountered among *Enteromorpha* sp. from Cochin backwaters, Kerala.

Type: Holotype (♂) will be deposited in National Pusa Collection, Entomology Division, IARI, New Delhi.

Etymology: Named after Dr. N. Balakrishnan Nair, Department of Aquatic Biology and Fisheries, University of Kerala.

Description: MALE: Idiosomal length of males ranged between 290 µm and 400 µm. All dorsal plates are separate (Fig. 10). AD with an anterior and two posterior (pyriform to circular) faint areolae made up of porose panels. The ds_1 located anterior to the posterior areolae of AD.



Figs.10-13: *Copidognathus balakrishnani* sp. nov.
10. idiosoma dorsal (♂); 11. gnathosoma; 12. GA of ♀; 13. idiosoma ventral (♂).

The ds_2 are placed at the anteromedian part of OC. The OC with two corneae without any areolae, but completely sculptured with panels. PD sculptured with reticulate panel having 4 longitudinal costae made up of porose panels. The ds_3, ds_4 and ds_5 are on the anterior, middle and posterior areas of PD respectively. A pair of adanal setae are present on anal papillae.

All ventral plates are separated by cuticular membranous areas (Fig. 13). Ventral plates without any areolae but sculptured with panels. AE bears 3 pairs of setae and PE bears 3 ventral and 1 dorsal setae. Eight to ten PGS are on each side of the GO. The GO is guarded by a pair of sclerites which bear 4 pairs of SGS. Paragenital areolae are absent but anal papillae are present.

Base of gnathosoma considerably broad (Fig. 11). Rostrum is short and stout, reaching the base of palpal tibiotarsus. A pair of proto-, deuto-, trito-, and basirostral setae are present on gnathosoma. Palp considerably small and 4-segmented, palpal trochanter and patella without any setae. Palpal femur with one dorsal seta and palpal tibiotarsus with three basal setae and distal eupathidia.

The chaetotaxy of legs I-IV is as follows:

Trochanter	1-1-1-0,
Basifemur	2-2-2-2,
Telofemur	5-5-2-2,
Patella	4-4-3-3,
Tibia	7-7-5-5.

The chaetotaxy of tarsus is discussed in the text.

All segments of all legs bear pores. Trochanter III clavate and devoid of posterodorsal spine. Telofemorae III and IV devoid of ventral setae (Fig. 16, 17).Tibiae I and II bear one hair-like slender seta and two stout robust pectinate setae ventrally, besides 4 dorsal setae (Fig. 14, 15). Tibiae III and IV bear 3 ventral setae (two slender and one stout, robust with pecten) and two dorsal setae.

Tarsus I bears 3 dorsal long setae, 1 solenidion, distal to solenidion 1 profamulus, 3 ventral setae (one basal filiform seta and two distal singlet eupathidia) and 4 PAS (two doublet eupathidia). Tarsus II bears 3 dorsal long setae, 1 solenidion, 2 singlet eupathidia (PAS) and no ventral setae. Tarsus III bears 3 dorsal fossary setae, 1 proximodorsal seta and 2 PAS. Tarsus IV with 3 dorsal fossary setae and 2 PAS.

All legs with two lateral claws and a bidentate median claw. Lateral claws are smooth ventrally.

FEMALE: Idiosomal length of females ranged between 300 µm and 480 µm. Female closely resembles the male except for genitoanal region. The cuticular membranous areas present on the dorsal and ventral sides of female are broader than in male.The width of the cuticular membrane is variable in different specimens. Three PGS are present on each side of the GO (Fig. 12). GO is guarded by a pair of sclerites bearing one pair of SGS. Ovipositor is small.

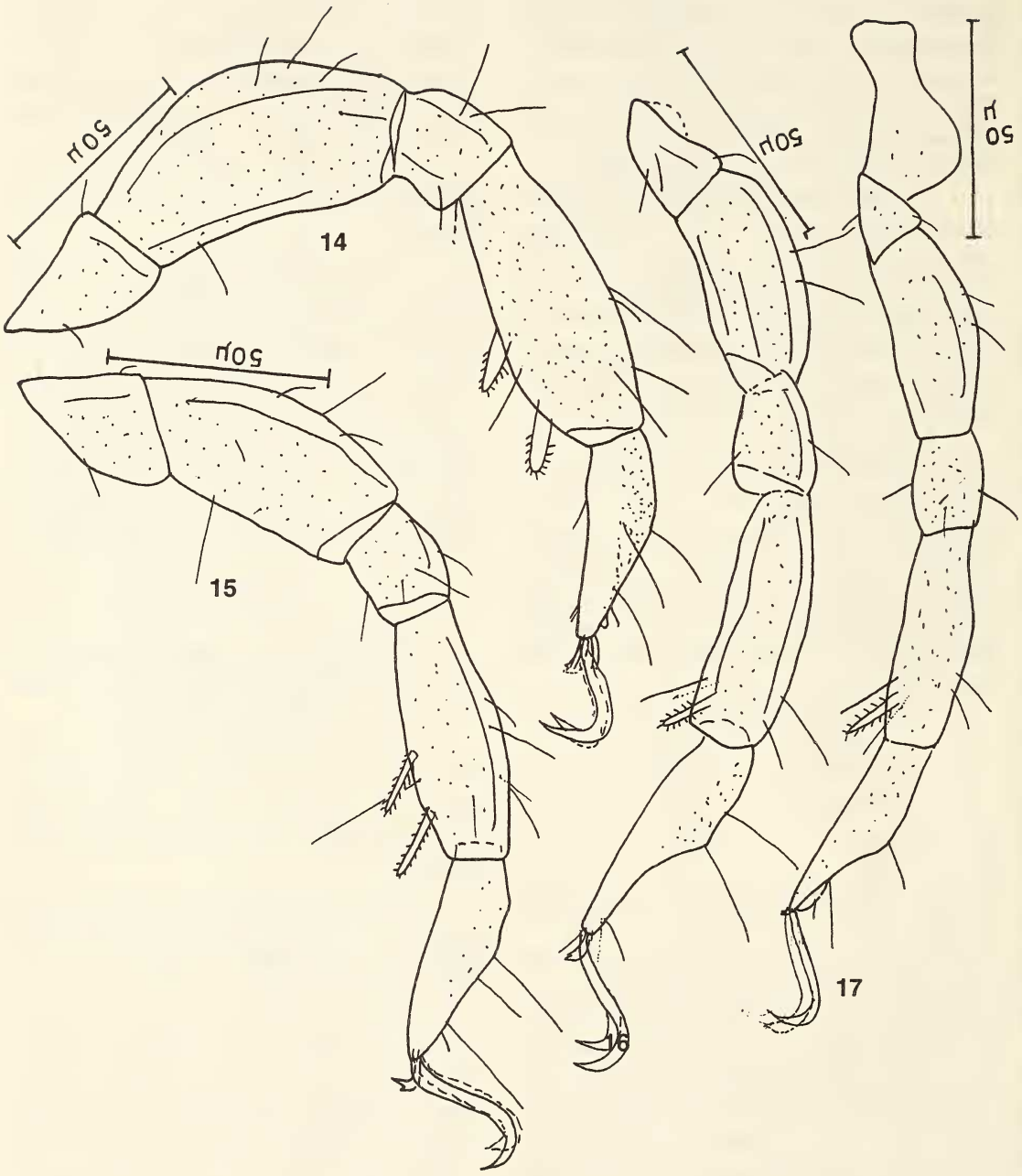
DISCUSSION

The species can be aligned with Newell's key group 7700 (Newell 1984) as the specimen at hand has the following characters:

X, OC: OC, PD: PD, 1:1, Para (i.e. EP I absent, ds_2 on OC in both sexes, ds_3 on PD in both sexes, basirostral setae 1 pair in both male and female, striae between AD and PD parallel).

While the present species falls in with the key group 7700, it differs from all other species of that group in the following formula (developed following Newell 1984):

X, 2: Cir, nor, trion 4:3, X, 2:2, 8-10, 0:0. (i.e. X = neither pore nor swelling is present, 2 posterior areolae on AD circular to pear-shaped in outline, anal papilla in male normal in form, OC triangular, dorsal seta of leg III and IV with 4 and 3 respectively, X = no postgenital papilla present, SGS in male 2:2, PGS in male 8-10 pairs, ventral setae of telofemora III-IV are 0:0).



Figs.14-17: *Copidognathus balakrishnani* sp. nov.
14. leg I (Basifemur-tarsus); 15. leg II (Basifemur-tarsus); 16. leg III (Basifemur-tarsus); 17. leg IV.

The specimens under dicussion cannot be identified satisfactorily with any of the described species of the genus. The striking features like faint areolae on AD and 4 costae made up of porose panels, short and stout gnathosoma with a small rostrum and palp, tibiae I and II with 3 ventral setae (of which one is hair-like, slender, and the other two pectinate, robust), tarsi III and IV with 4:3 dorsal fossary setae render the specimens distinct and are treated as new to science.

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